REMARKS

In reply to the Office Action of January 14, 2008, Applicants have amended claims 1-15, canceled claims 16-21, and added new claims 22-32. Accordingly, claims 1-15 and 22-32 are pending, with claims 1, 3, and 32 in independent form.

In the Action, claims 17-21 were rejected under 35 U.S.C. § 112, second paragraph, as allegedly being indefinite. Claims 17-21 were also rejected under 35 U.S.C. § 101 as allegedly failing to properly recite a process. Applicants have canceled claims 17-21 in this reply, making these rejections moot. Accordingly, reconsideration and withdrawal of the rejections of claims 17-21 under 35 U.S.C. §§ 101 and 112 is respectfully requested.

Claims 1-4, 7-10, and 16-21 stand rejected under 35 U.S.C. § 102(b) as allegedly being anticipated by Manning (U.S. Patent No. 3,903,413, "Manning"). Claims 16-21 have been canceled in this reply, obviating the rejection of these claims. Regarding the rejection of claims 1-4 and 7-10, Applicants respectfully disagree.

Independent claims 1 and 3 each cover radiation detectors that include, in part, at least one semiconductor chip that "comprises at least one III-V semiconductor material." Manning does not teach such a radiation detector. The Action states that Manning's device "contains at least one III-V semiconductor material (Si, i.e., silicon)" (Action at page 3). While Applicants agree that Manning's device is based on a silicon detector, silicon is not a III-V semiconductor material.

As understood in the art of semiconductor manufacturing, a III-V semiconductor material is a material that includes at least one element from each of groups III and V of the periodic table of the elements. Silicon is a group IV element, and therefore is not, by itself, a III-V semiconductor material.

The present application discloses that to detect radiation with a predetermined spectral sensitivity distribution – particularly, a spectral sensitivity distribution that corresponds to a standard sensitivity distribution of the human eye – a "silicon photodiode is often used" (specification, page 1, par. 3). However, the application also discloses that "the sensitivity of the diode presents a maximum which in the case of a silicon photodiode is located at about 800 nm"

(specification, page 1, par. 4), and so "[t]o use such a silicon photodiode as a detector with the spectral sensitivity distribution of the bright-adapted human eye, which has a sensitivity maximum at about 555 nm, requires extra expenditure since the wavelengths of the sensitivity maxima differ greatly from each other and the two spectral sensitivity distributions are therefore relatively poorly matched" (specification, page 1, par. 5). To achieve an improved match between the two spectral sensitivity distributions, "[a] radiation detector for detecting radiation according to a defined spectral sensitivity distribution … [includes] at least one semiconductor chip containing a III-V semiconductor material" (specification, page 2, par. 4).

Manning does not disclose such considerations. Instead, Manning takes what is acknowledged in the application as a conventional approach: Manning's devices include "a silicon photodiode" (Manning, col. 10, lines 14), and Manning states that "a correction filter with peak absorption in the near-infrared region of the spectrum, i.e., from about 700 nm to about 1200 nm, and high transmission in the visual region from about 400 nm to about 700 nm, should be used in association with the silicon photodiode to 'correct' its spectral response in relation to the film" (Manning, col. 5, line 62, through col. 6, line 1). Applicants have been unable to find any disclosure in Manning that relates to a detector that includes "at least one III-V semiconductor material," nor does there appear even to be any suggestion in Manning that to improve performance of his detector, a chip that includes at least one III-V semiconductor material could be used. To the contrary, it does not appear, based on Manning's disclosure, that he recognizes that such improvement is possible. Accordingly, Applicants submit that claims 1 and 3 are each patentable over Manning, and respectfully request reconsideration and withdrawal of the rejection of claims 1 and 3 under 35 U.S.C. § 102(b).

Claims 2, 4, and 7-10 depend from one of claims 1 and 3, and are therefore patentable over Manning for at least the same reasons. Accordingly, reconsideration and withdrawal of the rejection of claims 2, 4, and 7-10 under 35 U.S.C. § 102(b) is respectfully requested.

Claims 1, 5, 11-12, and 14-15 stand rejected under 35 U.S.C. § 102(b) as allegedly being anticipated by Starikov et al. (U.S. Patent Application Publication No. US 2002/0074553, "Starikov"). In particular, with regard to independent claim 1, the Action points to Figure 8 of

Starikov, stating that the at least one optical filter recited in claim 1 corresponds to multi quantum well region 86 in Starikov's device (see, e.g., Action at page 5).

Applicants respectfully disagree with the rejection of claim 1 as allegedly anticipated by Starikov. However, to expedite prosecution, and without conceding the rejection of claim 1, Applicants have amended claim 1 to cover radiation detectors that include, in part, at least one optical filter that "is disposed outside the at least one semiconductor chip." Support for this amendment is found, for example, in the application at page 6, paragraph 1, and in Figure 1B. Starikov does not disclose such detectors. Instead, where Starikov discloses a device having an optical filter (e.g., multi quantum well regions 63 and 86), the optical filter is disposed *within* (e.g. formed as a layer of) Starikov's semiconductor chip (see, e.g., Figures 6 and 8 of Starikov). For example, Starikov states, with respect to Figure 6, that "[l]ayers are first grown on sapphire substrate 61 in the following sequence: p-GaN layer 62, then multi-quantum well (MQW) region 63 of GaN/InGaN, then n-InGaN layer 64, then p-GaN layer 65" (Starikov, page 4, par. 0046). Starikov further states that "[t]he p-GaN/n-InGaN Multi Quantum Well (MQW) heterostructure 63 [is] grown in the photodetector part of the sensor structure" (Starikov, page 5, par. 0059). With respect to Figure 8, Starikov discloses that "[a] p-InGaN layer 87 [is] grown on the top of the MQW 86 region" (Starikov, page 6, par. 0064).

In other words, in Starikov's devices, his MQW filter is disposed within his semiconductor chip. Applicants have been unable to find any disclosure or suggestion in Starikov that teaches or provides a reason to fabricate radiation detectors having at least one optical filter that "is disposed outside the at least one semiconductor chip," as required by amended claim 1. Accordingly, Applicants submit that amended claim 1 is patentable over Starikov, and respectfully request reconsideration and withdrawal of the rejection of claim 1 under 35 U.S.C. § 102(b).

In this reply, claims 5, 11-12, and 14-15 have been amended to depend from independent claim 3 rather than from claim 1. Claim 3 is not rejected in the Action as allegedly either anticipated by, or obvious over, Starikov. Claim 3 covers radiation detectors that, in part, are "operative to detect incident radiation according to a standard spectral sensitivity distribution of

a human eye." Starikov does not disclose or suggest such detectors, and claim 3 is therefore patentable over Starikov for at least this reason. Similarly, amended depended claims 5, 11-12, and 14-15 are patentable over Starikov for at least the same reasons as claim 3. Accordingly, reconsideration and withdrawal of the rejection of claims 5, 11-12, and 14-15 under 35 U.S.C. § 102(b) is respectfully requested.

Claims 1-4 stand rejected under 35 U.S.C. § 102(e) as allegedly being anticipated by Nixon et al. (U.S. Patent Application Publication No. US 2003/0122060, "Nixon"). Independent claims 1 and 3 each cover radiation detectors that include, in part, at least one semiconductor chip that "comprises at least one III-V semiconductor material." The Action states that Nixon's device includes a semiconductor chip that "contains at least one III-V semiconductor material (silicon based)" (Action at page 6).

Applicants agree that Nixon's device is based on a silicon detector. For example, Nixon admits problems with his silicon-based detectors, stating that "[o]ne difficulty with silicon-based sensors is the difference in spectral sensitivity between silicon and the human eye … [a]mbient light filter 58 may be placed before or incorporated within ambient light sensor 50 … [s]imilarly, glare filter 60 may be placed before or incorporated within glare sensor 52" (Nixon, page 4, par. 0060).

However, as discussed previously in connection with Manning, silicon is not a III-V semiconductor material. Applicants have been unable to find any disclosure in Nixon relating to detectors that include a semiconductor chip that contains at least one III-V semiconductor material. Instead, Applicants note that, as in Manning, Nixon takes what is acknowledged in the application as a conventional approach: his devices include a silicon detector and one or more filters. There does not appear to be any disclosure in Nixon that corresponds to the considerations which are disclosed in the application, nor does there appear even to be any suggestion in Nixon that to improve performance of his detector, a chip that includes at least one III-V semiconductor material could be used. To the contrary, it does not appear, based on Nixon's disclosure, that he recognizes that such improvement is possible. Accordingly,

Applicants submit that claims 1 and 3 are each patentable over Nixon, and respectfully request reconsideration and withdrawal of the rejection of claims 1 and 3 under 35 U.S.C. § 102(e).

Claims 2 and 4 depend from claims 1 and 3, respectively, and are therefore patentable over Nixon for at least the same reasons. Accordingly, reconsideration and withdrawal of the rejection of claims 2 and 4 under 35 U.S.C. § 102(e) is respectfully requested.

Claims 6 and 13 stand rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Starikov. Without addressing the merits of the Action's obviousness arguments with respect to claims 6 and 13, Applicants note that in this reply, claims 6 and 13 have each been amended to depend from claim 3. As discussed previously, claim 3 is patentable over Starikov, at least because there is no disclosure or suggestion in Starikov that relates to radiation detectors that, in part, are "operative to detect incident radiation according to a standard spectral sensitivity distribution of a human eye," as required by claim 3. Accordingly, claims 6 and 13 are each patentable over Starikov for at least the same reasons as claim 3. Therefore, reconsideration and withdrawal of the rejection of claims 6 and 13 35 U.S.C. § 103(a) is respectfully requested.

In this reply, new dependent claims 22-31 have been added. Claim 22 covers radiation detectors for which "the difference between λ_1 and λ_0' is 15 nm or less." Support for the subject matter of claim 22 is found, for example, in previous claim 6.

Claim 23 covers radiation detectors having a filter layer, where "the filter layer extends over an entire face of the at least one semiconductor chip." Support for the subject matter of claim 23 is found, for example, in the specification at page 5, paragraphs 2-4, and in Figures 1A and 1B.

Claim 24 covers radiation detectors for which "the difference between corresponding values of the detector sensitivity and the standard spectral sensitivity distribution of the human eye is less than 25%." Support for the subject matter of claim 24 is found, for example, in previous claim 13.

Claim 25 covers radiation detectors that are "configured for use as an environmental light sensor." Support for the subject matter of claim 25 is found, for example, in the application at page 8, paragraph 3.

Claim 26 covers radiation detectors in which "the at least one semiconductor chip is an LED chip." Support for the subject matter of claim 26 is found, for example, in claim 5.

Claim 27 covers radiation detectors for which "a sensitivity distribution of the at least one semiconductor chip exhibits at least one maximum at a wavelength λ_1, and wherein a difference between λ_1 and λ_0 is 50 nm or less." Claim 28 covers radiation detector for which "the difference between λ_1 and λ_0 is 15 nm or less." Support for the subject matter of claims 27 and 28 is found, for example, in previous claim 6.

Claim 29 covers radiation detectors in which "the at least one semiconductor chip comprises a filter layer." Claim 30 covers radiation detectors where "the filter layer absorbs radiation having a wavelength that is smaller than λ_0." Support for the subject matter of claims 29 and 30 is found, for example, in claims 11 and 12.

Claim 31 covers radiation detectors where "the at least one III-V semiconductor material is $In_xGa_yAl_{1-x-y}P$, $In_xGa_yAl_{1-x-y}N$, or $In_xGa_yAl_{1-x-y}As$, and wherein $0 \leq x \leq 1$, $0 \leq y \leq 1$ and $x + y \leq 1$ for the at least one semiconductor material." Support for the subject matter of claim 31 is found, for example, in previous claim 14.

Each of claims 22-31 depends from one of claims 1 and 3, and is therefore patentable over Manning, Starikov, and Nixon, for at least the same reasons. Accordingly, allowance of claims 22-31 is respectfully requested.

New independent claim 32 has also been added, and covers radiation detectors that include, in part, "at least one semiconductor chip comprising a filter layer and at least one III-V semiconductor material," and "at least one optical filter disposed outside the at least one semiconductor chip." Support for the subject matter of claim 32 is found, for example, in claims 1 and 29.

Claim 32 is patentable over each of Manning and Nixon, at least because neither Manning nor Nixon discloses or suggests detectors having at least one semiconductor chip that includes "at least one III-V semiconductor material," as required by claim 32. Further, claim 32 is patentable over Starikov, at least because Starikov does not disclose or suggest detectors that

include "at least one optical filter disposed outside the at least one semiconductor chip," as recited by claim 32. Accordingly, Applicants respectfully request allowance of claim 32.

In view of the foregoing, Applicants ask that the application be allowed.

Canceled claims, if any, have been canceled without prejudice or disclaimer. Any circumstance in which Applicants have: (a) addressed certain comments of the Examiner does not mean that Applicants concede other comments of the Examiner; (b) made arguments for the patentability of some claims does not mean that there are not other good reasons for patentability of those claims and other claims; or (c) amended or canceled a claim does not mean that Applicants concede any of the Examiner's positions with respect to that claim or other claims.

Fees for the Petition for Extension of Time and excess claims are being paid concurrently on the Electronic Filing System (EFS) by way of Deposit Account authorization. Please apply any other charges or credits to Deposit Account 06-1050, referencing 12406-164US1.

Respectfully submitted,

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